

Effect of Antibiotics on the Control of Angular Leaf Spot
of Cotton Caused by *Xanthomonas malvacearum*
(E. F. Smith) Dowson

by

N. N. DESHPRABHU¹ and H. K. HANUMANTHA RAO²

Introduction : Attempts to control the phyto-bacterial diseases by the use of antibiotics have been made by several workers. The advantage of antibiotics over previous methods of plant disease control has been the fact that the antibiotics are absorbed by plants more readily and so are more effective against the disease control. Thirumalachar *et al* (1956) found penicillin effective at 1000 ppm "*in vitro*" on *Xanthomonas malvacearum*. Very little work appears to have been done with regard to determination of optimum doses of streptomycin sulphate and penicillin for the control of angular leaf spot of cotton as well as on their quick absorption by addition of glycerol. Trials were therefore, conducted in the field for two years to find out the optimum doses as well as time of application. Cotton variety "*Laxmi*" which is known to be highly susceptible to angular leaf spot in the region (Dhadesugur : Dist. Raichur) was grown for effective testing.

Material and Methods : Experiments were conducted during 1963-64 and 1964-65 *rabi* season at PIRRCOM Centre, Dhadesugur in order to study the effect of two antibiotics, streptomycin sulphate and penicillin for the control of angular leaf spot disease of cotton caused by *Xanthomonas malvacearum*. A field trial with randomised block design replicated four times and plot size 20' x 4' was laid out. Four concentrations, *viz.*, 50 ppm, 100 ppm, 250 ppm and 500 ppm and 0 ppm (water spray) of each antibiotic with an adequate control (no spray) were used. The antibiotics were used as spray with one per cent glycerol incorporated in each spray. Sprays were given after 30 days from the date of germination. In all, four sprays were given. The disease intensity was recorded 24 hours before each spray of antibiotics and only after the 4th spray, the disease score was recorded after 48 hours. The scoring of the disease was done following the method by Avtar Singh and Gera (1963) and converted into suitable percentages and angles. The average disease index recorded is given in Table.

Results and Discussion : In case of both the antibiotics there is steady decrease in the mean value of the disease index during 1963-64 and 1964-65, but with subsequent sprays, disease index decreases consequently the yield analysis for both antibiotics also shows that there is no significant differences between yields for different treatments during 1964-65, whereas during 1963-64

1 & 2 IARI, Regional Research Centre, Coimbatore-3.

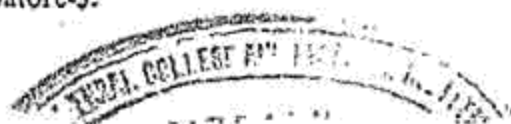


TABLE Percentage of Blackarm Index

Treatment	Year	1st spray		2nd spray		3rd spray		4th spray		4th spray after		kapas yield g/plot	
		S	P	S	P	S	P	S	P	S	P	S	P
Control (No spray)	1963-64	25.0	25.0	74.7	74.7	65.2	65.2	58.1	58.1	42.8	42.8	752	541
	1964-65	74.4	74.4	65.0	65.0	73.8	73.8	68.4	68.4	77.4	77.4	626	729
0 ppm (Water spray)	1963-64	15.0	23.6	75.7	80.2	61.9	66.8	44.3	61.6	32.3	44.4	685	571
	1964-65	96.2	90.5	51.2	46.6	54.4	72.1	50.2	74.3	45.4	71.6	712	765
50 ppm	1963-64	20.0	25.0	24.6	80.2	17.5	68.8	9.6	53.5	7.3	39.5	1001	668
	1964-65	93.4	85.1	63.3	47.8	43.1	41.9	29.6	39.5	25.3	46.0	631	902
100 ppm	1963-64	18.0	23.6	11.9	82.6	14.2	70.8	5.9	51.3	4.3	28.2	834	691
	1964-65	79.5	84.0	64.1	54.5	51.4	46.4	27.1	46.2	25.9	33.4	693	834
250 ppm	1963-64	17.0	24.3	4.7	80.2	5.0	62.9	5.9	49.6	1.5	26.6	882	689
	1964-65	74.1	84.7	61.7	46.2	51.7	35.9	26.3	30.8	12.1	23.2	813	886
500 ppm	1963-64	22.0	19.4	1.2	82.6	0.4	64.9	0.4	49.5	0.2	26.2	846	683
	1964-65	76.9	85.9	66.5	61.2	34.3	32.6	19.7	25.8	6.1	21.2	880	822
Mean	1963-64	18.67	23.48	31.22	80.83	26.37	66.57	28.40	53.93	12.15	34.62	833	630
	1964-65	82.13	84.10	62.80	58.55	49.28	50.45	32.82	47.50	25.95	45.47	726	823

Yield (gm/plot)

S: E. for treatments :	Streptomycin		Penicillin		Streptomycin		Penicillin	
	1963-64	1964-65	1963-64	1964-65	1963-64	1964-65	1963-64	1964-65
C.D. at 5%	0.732	0.677	0.319	0.543	48.1	74.1	52.9	50.2
	2.161	1.998	1.032	1.601	145.0	223.2	159.4	151.6

1) S : Streptomycin. P : Penicillin. 2) Disease scoring was taken 24 hours before each treatment.

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in the case of streptomycin there is significant difference among different treatments (concentrations), but in the case of penicillin, there is no significant difference among the different treatments. Mean yields under different treatments are given in Table.

The mean disease index under penicillin treatment does not vary significantly in the first year. Whereas in the second year eventhough the disease index is of higher order there is significant difference among the different treatments. The mean disease index under streptomycin treatment varies significantly in both the years, which is in accordance with Thirumalachar *et al* (1956). However, it can be seen that the disease index by sprays of penicillin can also be brought down quite low.

A comparative study of these two antibiotics shows that a single spray of streptomycin brings the disease markedly down, while three sprays are necessary for the complete control of the disease. This is in accordance with Balachandran *et al* (1960) who were able to control the disease to 95 and 51% during the first and second year respectively. In the case of penicillin the desired effect is achieved only after the four sprays. The stimulatory effect of the streptomycin can be seen on the vegetative growth of the plants. This has been observed by Stanek and Preslicka (1960) as quoted by Dekker (1963). Even though the lower concentrations of streptomycin spray could not have the desired effect on controlling the disease they are showing higher yields when compared to the control. Similar effects can also be seen in the case of penicillin. From the above observations it can be seen that streptomycin sulphate is more effective in controlling the disease than penicillin.

Summary: A single streptomycin foliar spray, though brings down the disease, three sprays are necessary for the complete control of the disease, while four sprays of penicillin are necessary to achieve the desired effect.

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